CLAIMS:

1. An emitter for emitting radiation in a first range of frequencies comprising:
a photoconductive material; and
first and second contact elements separated by a photoconducting gap provided by said photoconducting material, for applying a bias across said photoconducting gap,
wherein at least one of said first and second contact elements comprises a resistive element for restricting current flow between said first and second contact elements in a second range of frequencies lower than the first range of frequencies.

2. An emitter according to claim 1, wherein the first range of frequencies falls within at least a part of the frequency range from 0.02THz to 100THz.

3. An emitter according to either of claims 1 or 2, wherein said at least one contact element further comprises an antenna electrode provided in series with said resistive element, said antenna electrode being provided adjacent said photoconducting gap and having a lower resistance than said resistive element.

4. An emitter according to any preceding claim, wherein said at least one electrode further comprises a contact electrode provided in series with said resistive element, to allow an external electrical connection to be made to said resistive element.

5. An emitter according to any preceding claim, wherein the resistive element is integrated onto the emitter.

6. An emitter according to any preceding claim, wherein the resistive element comprises at least one of the following:
Indium Tin Oxide, Indium Oxide, Tin Oxide, Indium Titanium Oxide, Titanium Oxide, Nickel-Chrome, doped Silicon Dioxide, Silicide, Poly-Silicon, Carbon, doped GaAs, lightly doped Silicon, nichrome or AlGaAs heterolayer.

7. An emitter according to any preceding claim, wherein the photoconductive material comprises at least one of the following:

Si, Ge, GaAs, LT-GaAs, As-implanted GaAs, InAs, ion-implanted Si, ion-implanted Ge, LT-InAs, LT-InGaAs, LT-AlGaAs, a III-V group semiconductor, a II-VI group semiconductor, an ion-implanted semiconductor and a low temperature grown semiconductor.

8. An emitter according to any preceding claim, further comprising a dielectric film at least partially covering an emission surface of the emitter.

9. An emitter according to claim 3, wherein a dielectric film at least partially covers the antenna electrode.

10. An emitter according to any preceding claim, wherein a dielectric film at least partially covers the photoconductive gap.

11. An emitter according to any of claims 8 to 10, wherein the dielectric film comprises at least one of the following:

Silicon Nitride, Polyimide, Gallium Nitride, Acrylic or Silicon Dioxide.

12. An emitter according to any preceding claim, wherein the edges of the contact elements which are adjacent the photoconducting gap are recessed below the surface of the photoconductive material.

13. An emitter according to any preceding claim, wherein the edges of the first and second contact elements provided adjacent the photoconducting gap are rounded.

14. An emitter according to any preceding claim, wherein said resistive element has a resistance R, where $R > \frac{1}{AC}$ where A is the repetition frequency of an excitation laser and C is the capacitance of the contact elements.

15. An emitter according to any preceding claim, wherein said resistive element has a resistance of at least 5kΩ.

16. A method of determining a resistive value for use as a biasing resistance in a terahertz emitter, comprising:

determining a value indicative of a repetition frequency of an excitation laser;

determining a value indicative of a capacitance of the emitter; and

calculating the resistive value by equating the value indicative of the repetition frequency with an RC-time constant of the terahertz emitter.

17. A method for determining a resistive value, R, for use as a series biasing resistance in a terahertz emitter comprising a photoconductive substrate and an antenna electrode on the substrate surface, the method comprising:

determining the resistive value using the formula:

$$A = 1/(RC)$$

where A is a repetition frequency of an excitation laser and C is the capacitance of the antenna electrode.

18. The method of claim 17, wherein C further comprises the capacitance of conductors between the resistive element and an antenna, which feed the antenna.

19. An apparatus for imaging comprising an emitter as claimed in any one of claims 1 to 15.

20. An apparatus for determining compositional information of structures comprising an emitter as claimed in any one of claims 1 to 15.

21. The apparatus of claim 19 or 20, further comprising a transformer for biasing the emitter with an AC voltage.

22. The apparatus of any one of claims 19 to 21, further comprising a pulsed laser source.

23. A system for generating and detecting terahertz radiation including an emitter as claimed in any one of claims 1 to 15, and a detector which comprises a bowtie antenna terahertz receiver.

24. An emitter substantially as herein described with reference to the accompanying drawings.